AMENDMENTS TO THE DRAWINGS

Attached are three drawing sheets showing the changes made to Figures 3, 5, 6, and 7, and three replacement sheets for review and approval by the Examiner.

Attachment: 3 Annotated Sheets Showing Changes Made

3 Replacement Sheets

REMARKS

I. Status of the Claims and the Rejections

Claim 32 was rejected under 35 U.S.C. § 102 as being anticipated by Kleen U.S. Patent No. 2,499,736 ("Kleen '736). Claims 19-22, 25, and 27-32 were rejected under 35 U.S.C. § 103 for obviousness based on Fischer et al. U.S. Patent No. 5,513,500 (Fischer '500) in view of Plattner U.S. Patent No. 6,658,881 (Plattner '881). Applicants respectfully traverse these rejections.

Nevertheless, independent claims 19 and 32 have been amended to further clarify the subject matter regarded as patentable. Applicants respectfully request reconsideration in view of these amendments and the following remarks.

II. Objections to the Drawings and the Specification

The drawings were objected to for failing to show every feature of the invention specified in the claims as well as for failing to show reference numeral 156 from the detailed description. Applicants have amended Figures 3, 5, 6, and 7 to correct typographical errors and to overcome these objections. More specifically, Figures 6 and 7 have been amended to show the regulation device (252, 352), the temperature sensor (250, 352) and the associated control lines (254, 256, 354, 356), thereby showing the embodiments of claims 27-31. A corresponding explanatory sentence for these features has also been added to paragraph [0051] of the specification: "Again the regulation device 252 is operatively coupled to the ventilator 240 via control line 254, to the temperature sensor 250, and to the regulator valves 278, 280, 286 via control lines 256." These amendments are fully supported by the original specification at paragraphs [0016], [0047], and [0056]. Applicants

also observe that paragraph [0051] explains that the quantity of heat transferred by the system of Figure 6 can be changed by controlling the ventilator and/or the regulator valve, which is precisely the same control operations described for Figure 5. Thus, it is proper to amend Figures 6 and 7 to include the regulation device, the temperature sensor, and the control lines of Figure 5. Applicants respectfully request that the objections to the drawings now be withdrawn.

The specification was objected to for incorrectly labeling regulator valves 278, 280 as "regulation devices." Applicants have amended the specification to correct this and other typographical errors. Applicants respectfully request that the objection to the specification now be withdrawn.

III. Claim 32 is Novel

A. The Claim

Claim 32 has been amended to recite a method for the discharge of heat from a heat source located in the interior of an aircraft to a heat sink, the method including "causing, via at least one heat exchanger which operatively couples the piping system to the heat source, heat transfer in the heat intake section; and controlling, via a ventilator, the heat transfer between the at least one heat exchanger and the heat source." Applicants respectfully assert that that the amended claim 32 is allowable over the currently cited prior art.

B. The Deficiencies of the Cited Prior Art

Kleen '736 is directed to an aircraft refrigeration device for a cargo space of an aircraft. As shown in FIG. 6, the refrigeration system includes a hermetically sealed tube containing a vaporizable refrigerating medium. The hermetically sealed tube extended from

a condensing chamber (11) within an air duct (31) of the aircraft and a vaporizing chamber (12) within the cargo space (B), the chambers (11, 12) connected by an intermediate connecting section (13). The condensing and vaporizing chambers (11, 12) have respective fins (14, 17) along their outer surfaces to assist in heat transfer to and from the refrigerating medium in the tube. The air duct (31) directs a flow of ambient cooling air past a duct inlet with shutters (32) and through a sequence of louvres (36) that direct the cooling air flow onto the condensing chamber (11). The refrigerating medium absorbs heat in the vaporizing chamber (12) from the cargo hold (B) and turns into a gas which rises into the condensing chamber (11), where the refrigerating medium expels heat to the cooling air flow and in the process condenses back to a liquid. This refrigerating medium liquid then travels back down into the vaporizing chamber (12) where the cycle repeats to continuously deliver heat from the cargo hold (B) to the ambient cooling air flow.

The current Office Action states that the fins (14) on the condensing chamber (11) were the "heat exchanger" and the cooling air flow represented the "ventilator" of claim 32. Applicants have now amended claim 32 to clarify that the ventilator controls heat transfer between the heat source and the heat exchanger that couples the heat source to the piping system. Even if the cooling air flow through the air duct (31) of Kleen '736 is a "ventilator," this cooling air flow does not control the heat transfer between the cargo hold heat source and the vaporizing chamber (12). Thus, claim 32 is allowable over Kleen '736. Applicants respectfully request that the rejection of claim 32 now be withdrawn.

IV. Claims 19-22, 25, and 27-32 are Not Obvious

A. The Claims

Claim 19 recites an "Aircraft having a cooling device for expelling heat from a heat source located in the interior of said aircraft to a heat sink comprising a piping system sealed against the surrounding atmosphere [and] filled with a heat conveyance medium which, when heat is received in the heat intake section from the heat source, undergoes a transition from the liquid phase to the gaseous phase, then flows into the heat output section, then condenses when discharging heat to the sink, and then flows back to the heat intake section." The cooling device of claim 19 also includes "a regulator valve operatively connected to the piping system, thereby to control a quantity of heat conveyance medium flowing to or from the heat exchanger." Claim 19 has been amended in a similar fashion as independent method claim 32, which was discussed above and also includes the phase-changing feature of the heat conveyance medium.

Claims 20-22, 25, and 27-31 depend directly or indirectly from claim 19 and include additional features of the claimed cooling system. For example, claim 27 recites "a cold storage unit provided between the heat source and the heat sink." Claim 31 recites that when the aircraft is in a rest condition, "the heat sink is located geodetically higher than the cold storage unit, which is further located geodetically higher than the heat source."

B. The Deficiencies of the Prior Art

Fischer '500 is directed to a system for cooling food trolleys in the cabin of an aircraft. As shown in FIG. 2, Fischer '500 discloses a central cooling plant (4) located underneath the cabin of an aircraft and selectively coupled to heat exchangers (9A, 9B) in the aircraft galleys via a supply conduit (5) and a return conduit (6). The heat exchangers (9A,

9B) in the galleys (3A, 3B) are coupled to the supply and return conduits (5, 6) using a plurality of connector conduits (10A, 10B, 11A, 11B) and connector adapters (35, 36) that purportedly allow quick connection and disconnection of the components cooling system (1) when cabin reorganization is necessary. The supply and return conduits (5, 6) carry a liquid cooling medium such as a water/glycol mixture, and the heat exchangers (9A, 9B) "are embodied as liquid/air heat exchangers through which the coolant flows in a primary circuit and air flows in a secondary cooling air circuit (12A, 12B)." (Col. 4, line 66 – Col. 5, line 2). The liquid cooling medium is driven by a pump (7) from the supply and return conduits (5, 6) to a heat exchanger (4') where cooling air (14) from outside the aircraft removes heat from the liquid cooling medium. The liquid cooling medium may also be directed to a skin heat exchanger (41) which uses the aircraft exterior to remove heat from the liquid cooling medium.

The Office Action acknowledges that Fischer '500 does not teach that the heat conveyance medium vaporizes in the heat intake section (9A, 9B) or condenses in the heat output section (4'). However, the Office Action cites Plattner '881 for the teaching of a two-phase vaporization refrigeration device (14 of FIG. 1) on board an aircraft, and concludes that it would have been obvious to implement the Plattner '881 system in place of the liquid cooling system of Fischer '500 because of the "greater cooling capacity of harnessing the phase change of the heat conveyance medium." Applicants respectfully disagree.

The Fischer '500 system specifically uses a water/glycol mixture because the mixture has a relatively high heat capacity (*see* Col. 4, ll. 38-40). Furthermore, Fischer '500 teaches that the water/glycol mixture is advantageous because it allows for simple liquid/air heat exchangers to be used in each of the individual galleys (*see* Col. 3, ll. 7-13). This

corresponds with the primary thrust of Fischer '500, which was to provide a refrigerating system that is able to easily reconfigured with cabin reconfigurations. A person having skill in the art would not have replaced the liquid cooling system of Fischer '500 with the two-phase system of Plattner '881 for a plurality of reasons. First, the reasoning of replacing the Fischer '500 system was to provide "greater cooling capacity," but this reasoning is flawed because the water/glycol mixture already provides a relatively high heat capacity. In order to use the Plattner '881 system, the simple liquid/air heat exchangers (9A, 9B) of Fischer '500 would need to be replaced with all of the equipment in the Plattner '881 system, including a receiver/dryer (18 of FIG. 1), an expansion valve (20), an evaporator (22), and a compressor (24). These additional pieces of equipment add weight to the aircraft in an undesirable fashion and may limit the reconfiguration possibilities for the cabin of the aircraft. Thus, replacing the Fischer '500 system with the two-phase system of Plattner '881 appears to undermine the primary thrust of the Fischer '500 system without providing the benefits of a "greater cooling capacity."

Consequently, it would not have been obvious to combine Fischer '500 and Plattner '881 in the manner the Office Action states, and claims 19 and 32 are allowable over the cited references. Dependent claims 20-22, 25, and 27-31 recite unique combinations of features and are also allowable over the cited references for at least the same reasons. Applicants respectfully request that the rejection of claims 19-22, 25, and 27-32 now be withdrawn.

Furthermore, dependent claims 27 and 31 are not obvious in view of Fischer '500 and Plattner '881 for additional reasons. The Office Action states that Fischer '500 discloses a "cold storage unit between the heat source and the heat sink" as recited in claim

27 because the cooling plant (4) is located between the food trolleys (8A) and the skin heat exchanger (41). However, the cooling plant (4) is not a "cold storage unit" as understood by the currently-claimed invention. The cold storage unit is loaded with condensed heat conveyance medium during normal operations and is only used to provide additional heat conveyance medium flow to the heat source if necessary (*see* paragraph [0052]). The cooling plant (4) of Fischer '500 does not reserve a store of condensed heat conveyance medium, nor is the cooling plant (4) disposed "between" the food trolleys (8A) and the skin heat exchanger (41). The skin heat exchanger (41) is never used in conjunction with the cooling plant (4), as Fischer '500 describes that the connector conduits (5', 6') are selectively coupled to the skin heat exchanger (41) instead of the heat exchanger (4') of the cooling plant (4). (Col. 5, ll. 43-49). Plattner '881 fails to overcome these deficiencies of Fischer '500 with respect to claim 27, and claim 27 is allowable over the cited references for at least these additional reasons.

With respect to claim 31, the Office Action acknowledges that the skin heat exchanger (41) of Fischer '500 is located on the bottom of the aircraft, but concludes that the skin condenser (12) of Plattner '881 could be located on top of the aircraft in place of the skin heat exchanger (41) in order to locate the heat sink geodetically higher than the cold storage unit and the heat source. However, claim 31 now further requires that the cold storage unit is geodetically higher than the heat source. Under the Office Action's interpretation of claim 27, the cooling plant (4) is the cold storage unit and the heat source is the food trolleys (8A). Fischer '500 expressly teaches away from moving the cooling plant (4) into the cabin (*see* Col. 4, ll. 4-8), which is where the cooling plant (4) would need to be located in order to provide a "cold storage unit" geodetically higher than the food trolleys (8A) in the cabin

galleys. Thus, the proposed combination of Fischer '500 and Plattner '881 fails to render claim 31 obvious for at least these additional reasons.

V. Conclusion

Based on the amendments to the specification and the claims, the replacement drawings, and these Remarks, Applicants respectfully submit that all presently-pending claims are patentable and should be allowed without delay.

Applicants do not believe any fees are due with the submission of this amendment. If any fees are necessary, the Commissioner is hereby authorized to charge any underpayment or fees associated with this communication or credit any overpayment to Deposit Account No. 23-3000.

Respectfully submitted,

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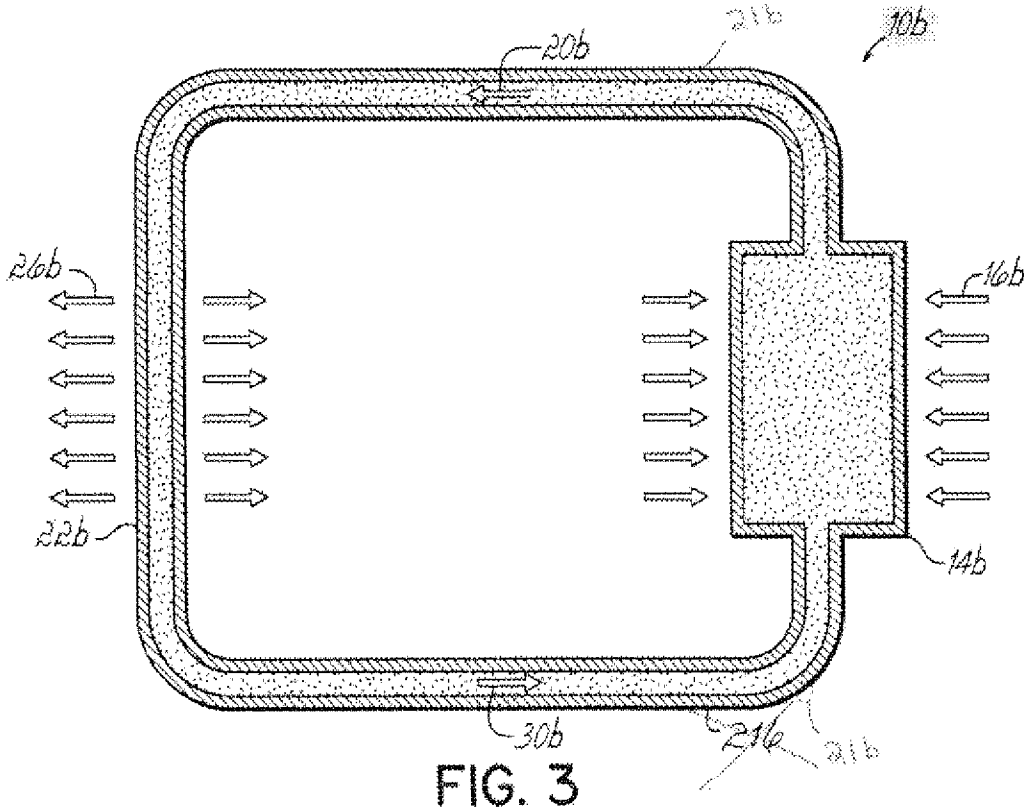
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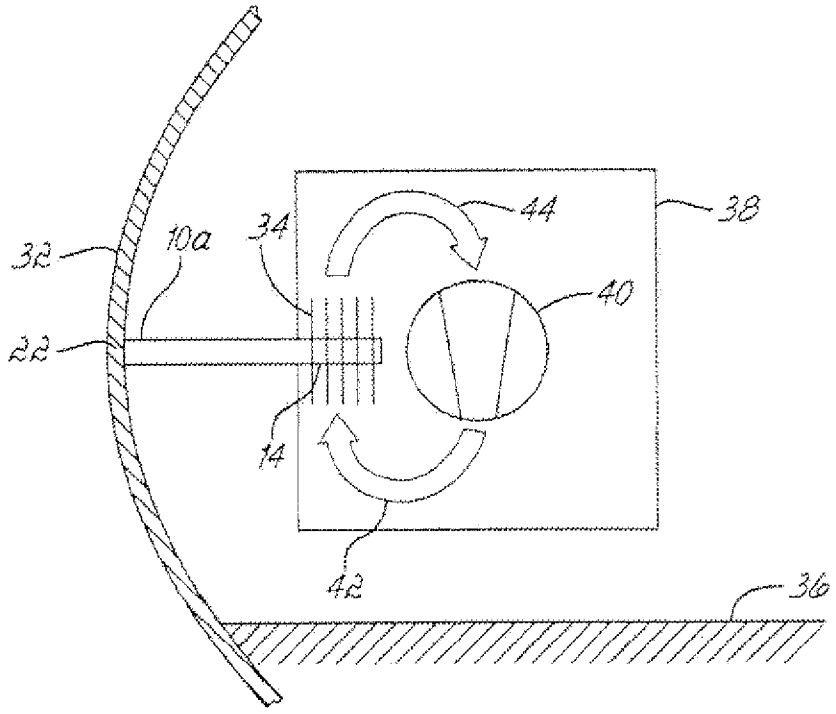
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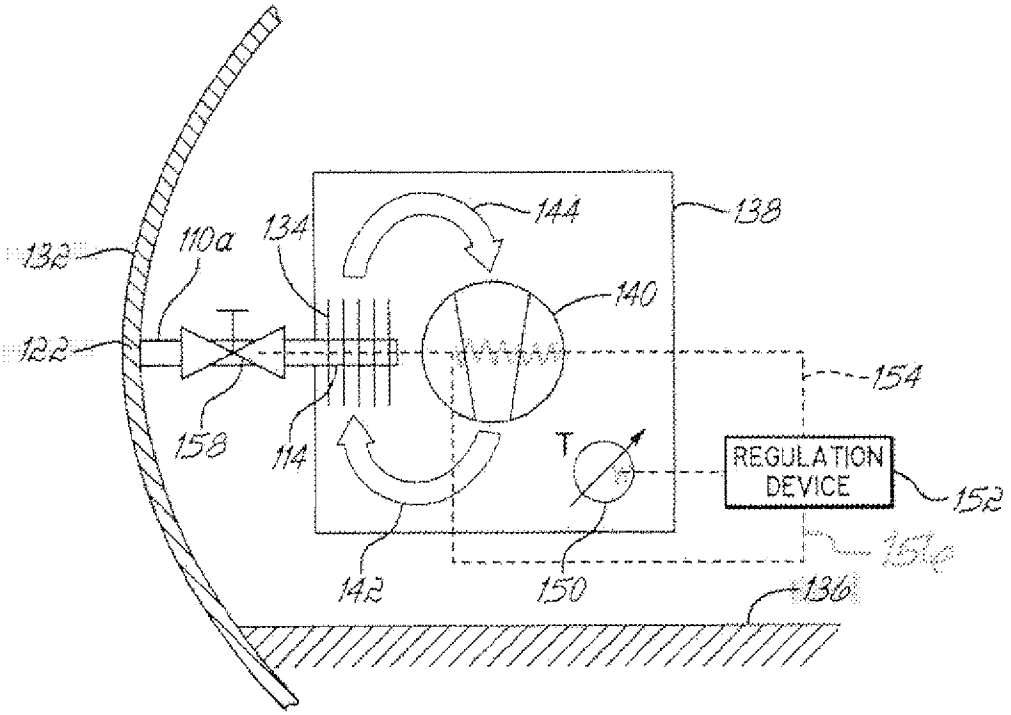
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FIG. 5

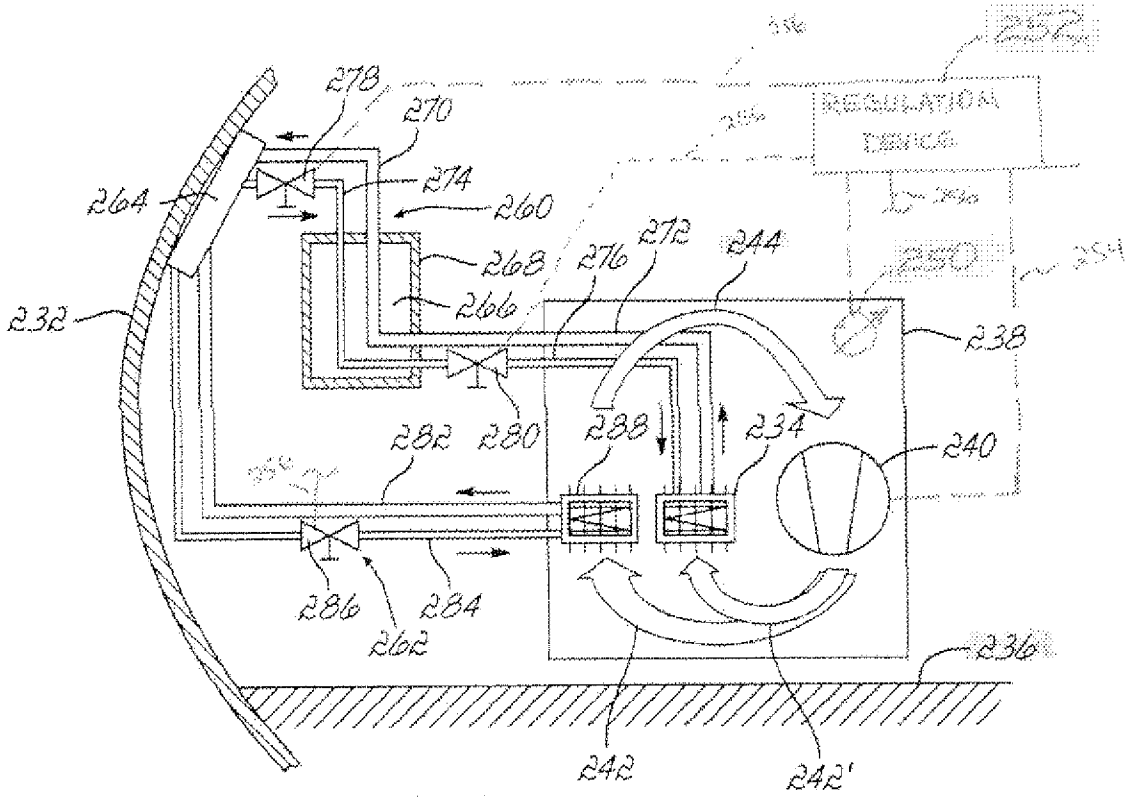
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FIG. 6

ANNOTATED SHEET

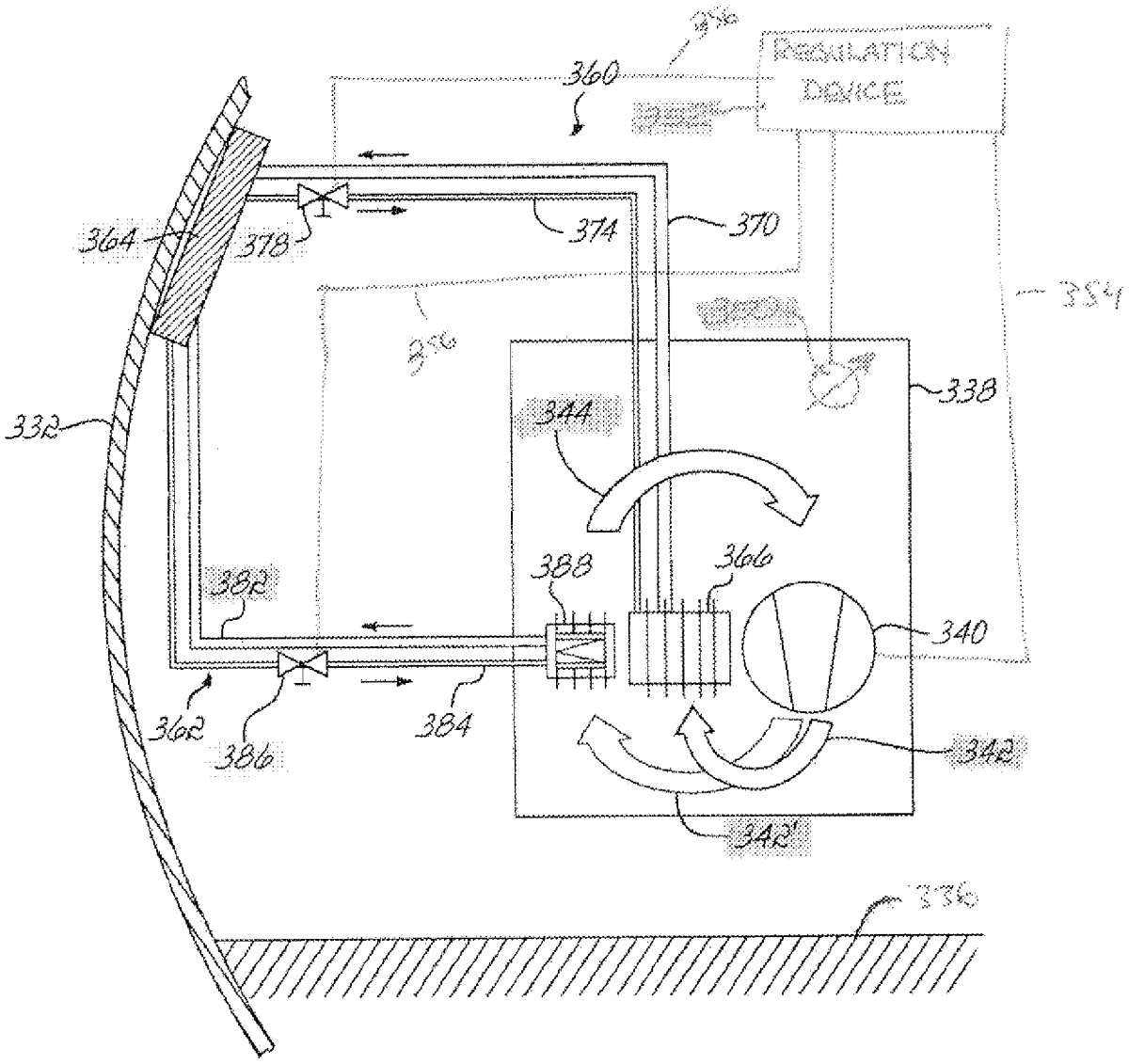

FIG. 7